

DETAILED ACTION

Claims 1 - 7, 15 and 16 have been examined. Claims 8 - 14, 17 and 18 have been withdrawn by Applicant via election restriction.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 3, 5 - 7, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (6,356,817) in view of Kuang et al. (6,590,299) and Gabriel et al. (6,664,751). Abe discloses a power output unit for a hybrid vehicle comprising:

- an internal combustion engine (Fig. 1, item 150);
- a drive shaft (Fig. 1, item 112);
- an electric power-mechanical power input output module (Fig. 1, item 120);
- said power input output module including an output shaft of said internal combustion engine, said drive shaft and a third shaft (Fig. 1, items 156, 112, and 127);
- said third shaft being connected to a generator (Fig. 1, item MG1);
- said generator having a first rotor linked with said output shaft of said internal combustion engine and a second rotor linked with said drive shaft

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and rotating relative to said first rotor and outputting at least part of the power from said internal combustion engine to said drive shaft (Fig. 1, items 133 and 132);

- said power input output module being linked with an output shaft of said internal combustion engine, with said drive shaft and outputting at least part of the power from said internal combustion engine to said drive shaft (column 9, lines 15 - 22);
- a motor capable of inputting and outputting power to and from said drive shaft (Fig. 1, item MG2);
- an accumulator capable of supplying and receiving electric power to and from said input output module and said motor (Fig. 1, item 194);
- a power demand setting module that sets a power demand in response to an operator's manipulation (column 9, lines 9 and 10);
- a target power setting module that sets a power to be output from said internal combustion engine based on the setting of said power demand (Fig. 1, item 170);
- a drive restriction module which effects a drive restriction of said motor based on a predetermined restricting condition (Fig. 1, item 191 and Fig. 6 S140);
- a correcting module that corrects said setting of said target power based on said drive restriction (Fig. 6, item S170);

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- a control module that executes normal control of said internal combustion engine, said power input output module and said motor when no drive restriction is effected (Fig. 1, item 190 and Fig. 6);
- a control module that executes restriction control of said internal combustion engine, said power input output module and said motor when drive restriction is effected (Fig. 1, item 190 and Fig. 6);
- a charge-discharge electric power measurement module that measures a charge-discharge electric power used to charge said accumulator or obtained by discharging said accumulator (column 10, lines 1 - 16);
- an electric power demand setting module that sets an electric power demand for charging or discharging said accumulator (column 10 , lines 1 - 16);
- said correction module corrects the setting of said target power to compensate for a difference between said charge-discharge electric power measured and said electric power demanded (column 10, lines 1 - 16);
- said target power setting module specifies a target torque and a target revolution speed to set said target power (column 10 , lines 35 - 37);
- said correction module varies said target revolution speed to correct said target power (column 11, lines 15 - 17).

Abe does not disclose the use of temperature of a motor as a control variable.

Kuang, however, discloses a hybrid electrical vehicle control strategy comprising:

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- a hybrid vehicle including a motor, wherein a restriction upon the use of said motor is based upon a temperature of said motor (Fig. 2, item 82 and column 6, lines 19 - 22).

It would have been obvious to one of ordinary skill in the art at the time the instant invention was made to make use of the temperature based motor control of Kuang with the hybrid vehicle of Abe in order to minimize the potential for damage of said motor from over use and/or overheating.

Abe in view of Kuang does not disclose control based upon inverter temperature. Gabriel, however, discloses a controlling strategy for electronic components in a hybrid electric vehicle comprising:

- an inverter coupled between a battery and a motor to transmit electric power therebetween (Fig. 3, item 534);
- wherein said inverter is restricted in operation when a temperature is not less than an upper limit inverter temperature (column 4, lines 50 - 62).

It would have been obvious to one of ordinary skill in the art at the time the instant invention was made to combine the hybrid vehicle of Abe in view of Kuang with the control strategy of Gabriel in order to efficiently cool vehicle electrical components. This would allow an increase in the expected lifetime of said components from limiting damage due to overheating or running at high heat.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (6,356,817) in view of Kuang et al. (6,590,299) and Gabriel et al. (6,664,751) as applied

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to claims 1 - 3, 5 - 7, 15 and 16 above, and further in view of Tadao et al. (JP2000-087785), cited by Applicant. Abe in view of Kuang and Gabriel does not disclose the use of power control based on load ranges. Tadao, however, discloses a hybrid electric vehicle comprising:

- an engine mode set in response to a vehicle being in a light load state (paragraphs 22 and 23).

It would have been obvious to one of ordinary skill in the art at the time the instant invention was made to include the control parameters of Tadao with the power output unit of Abe in view of Kuang and Gabriel in order to enable control of a power system based on the required load, specifically, restricting power output when a low load is required. This reduces wear and tear on mechanical components and conserves fuel.

Response to Arguments

Applicant's arguments with respect to claims 1 - 7, 15 and 16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Adachi et al. (7,000,718) disclose a power output apparatus and hybrid vehicle;

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- Komiyama et al. (7,055,636) disclose a drive control device for a hybrid vehicle;
- Amano et al. (2001/0017227) disclose a hybrid vehicle;
- Yamaguchi et al. (2002/0062183) disclose a control system for a hybrid vehicle.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN D. WALTERS whose telephone number is (571)272-8269. The examiner can normally be reached on Monday - Friday, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on (571) 272-7742. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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John D. Walters
Examiner
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/Paul N. Dickson/
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